Large-Scale Maps of Down Forest Fuels Based on the FIA Inventory

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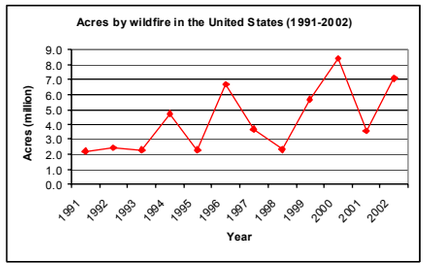
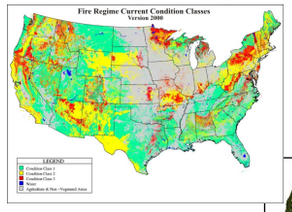
Why Create National Fuel Maps?



Fire Season 2000

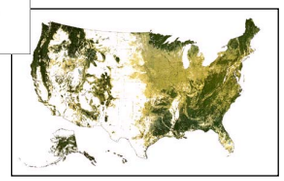
Fire Season 2002

The acreage of U.S. forests burned by wildfire and the intensity these fires has been increasing during the past decade. The severe fire seasons of 2000 and 2002 have prompted a public call for management and alleviation of forest fire hazards across the U.S. In order to spatially assess fire hazards at the national-scale, large-scale maps of forest fuels are required.

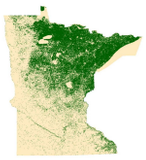


Fire Condition Classes

Stand Density



A forest's fire hazard is assessed through examination of numerous forest attributes. Some forest attributes such as standing tree density or fire condition class have already been assessed at the national-scale. A fundamental component of fire hazard and driver of fire behavior is that of down forest fuels (coarse woody, fine woody, slash, duff, and litter) which has never been assessed at the national-scale.



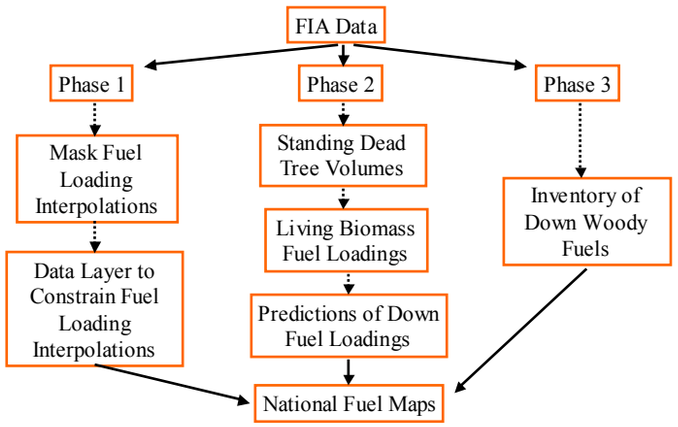
Phase 1

Phase 2

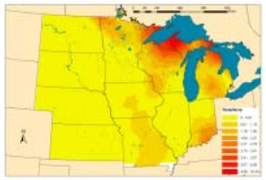
Phase 3

The FIA Program of the USDA Forest Service has the nationally consistent, multi-scale data necessary to create national assessments of down fuel loadings.

How Do We Create Fuel Maps?



Data contributions from all phases of the FIA inventory program provide numerous methodologies for creating national fuels maps.



Ordinary kriging prediction of fine woody fuels based on 2001 FIA Phase 3 Down Woody Material plots

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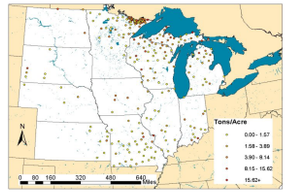
Forest/non-forest NLCD coverage for north central states

Interpolations of fuel loadings between FIA phase 3 plots, combined with phase 1 forest/non-forest maps, may produce regional/national fuel maps.



FIA Down Woody Material plot locations (year 2001) and associated estimates of coarse woody debris

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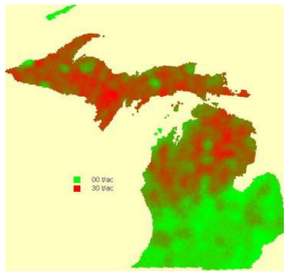
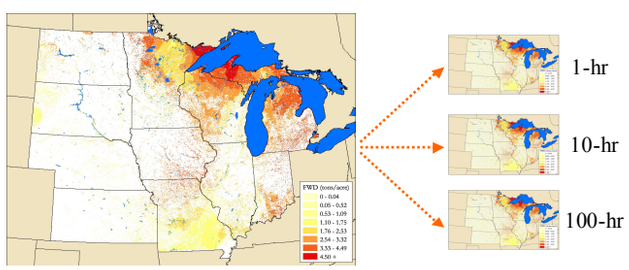
Forest fuels may be displayed as mean values by relevant ancillary data layers (such as ecological provinces or fuel condition classes).



Nearest neighbor interpolation of predicted down fuels for Michigan FIA Phase 2 plot attributes based on Phase 2/Phase 3 fuel model (McRoberts et al. 2001)

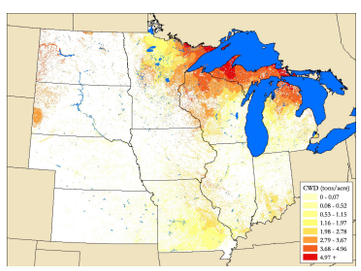
Down fuels may be predicted for FIA phase 2 plots from models based Phase 3 plots.

Map Examples



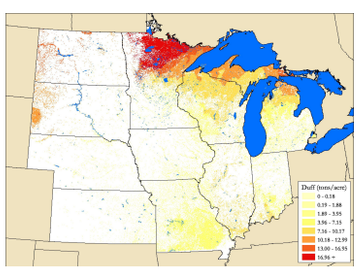
Fine Woody Debris (tons/acre)

Fine woody debris includes 1-hr, 10-hr, and 100-hr fuels for which a separate map be produced.



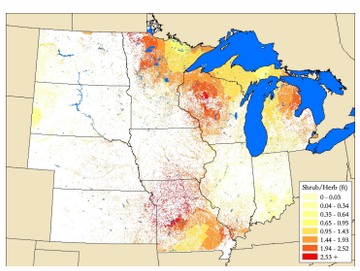
Coarse Woody Debris (tons/acre)

Coarse woody debris maps may both aid fuel management efforts and other forest ecosystem analyses such as wildlife and stand structural diversity investigations.



Duff (tons/acre)

Duff maps provide information on an important component of down forest fuels totals while also aiding carbon pool assessment efforts.



Shrub/Herb Height (feet)

The height of understory vegetation may be an important indicator of fuel ladders in forest ecosystems.

Conclusions and Future Directions

Strategic assessment and management of forest fuels for the purposes of fire hazard reduction requires regional-scale forest fuels maps. The Down Woody Materials Indicator of the Forest Inventory and Analysis Program, in coordination with all phases of the FIA inventory program, provides the data necessary to produce regional-scale maps of forest fuels. There are numerous methods for creating down fuel maps. Spatial interpolations of fuel loadings map be masked with FIA Phase 1 forest/non-forest data layers to produce fuel maps. Mean fuel loadings by an ancillary data layer, such as ecological province, may be masked with the FIA Phase 1 forest/non-forest data layers as an alternative methodology. Finally, a modeling approach may be utilized where fuel loadings are predicted for all FIA phase 2 inventory plots based on the Down Woody Materials phase 3 inventory. 2001 was the first year of the DWM inventory. As the down woody inventory progresses, and as mapping techniques are thoroughly evaluated, national-scale maps of down forest fuels will become available to researchers, foresters, and policy-makes alike.

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